In the Claims:

1. (Currently Amended) An optical information carrier comprising a solid material having immobilized proteorhodopsin; wherein said proteohrodopsin is detergent-solubilized.

2. (Original) The optical information carrier according to Claim 1, further comprising a substrate selected from the group consisting of glass, paper, metal, fabric material, plastic material, wherein said solid material is deposited on said substrate.

3. (Original) The optical information carrier according to Claim 1, wherein said optical information carrier is a fraud-proof data carrier or an optical data storage material.

4. (Original) The optical information carrier according to Claim 1, wherein said solid material comprises one or more hydrophilic polymers that are capable of forming a homogeneous phase with proteorhodopsin prior to solidification to a solid form.

5. (Original) The optical information carrier according to Claim 4, wherein said hydrophilic polymer is selected from the group consisting of silica sol-gel, gelatin, polyvinylalcohol, agarose, agar, methyl cellulose, polyvinyl acetate, polyvinyl pyrrolidone, and polyethylene glycol.

6. (Original) The optical information carrier according to Claim 4, wherein said hydrophilic polymer is not polyacrylamide.

7. (Original) The optical information carrier according to Claim 1, wherein said hydrophilic polymer is selected from the group consisting of silica sol-gel, gelatin, and polyvinylalcohol.

8. (Original) The optical information carrier according to Claim 1, wherein said solid material is in the form of a film or a thickly cast object.

9. (Original) The optical information carrier according to Claim 1, wherein said carrier produces an erasable image.

10. (Original) The fraud-proof material according to Claim 3, wherein the immobilized proteorhodopsin changes color upon illumination with a light of the excitation wavelength of the proteorhodopsin.

11. (Original) A fraud-proof material comprising at least two solid materials each containing immobilized proteorhodopsin having different maximum absorption wavelengths.

12. (Original) An optical information carrier comprising a solid material having immobilized proteorhodopsin, wherein said proteorhodopsin is in a monomer or an oligomer form and is stable for at least one month at room temperature.

13. (Original) The optical information carrier according to Claim 12, wherein said solid material comprises one or more hydrophilic polymers that are capable of forming a homogeneous phase with proteorhodopsin prior to solidification to a solid form.

14. (Original) The optical information carrier according to Claim 13, wherein said hydrophilic polymer is selected from the group consisting of silica sol gel, gelatin, polyvinylalcohol, polyacrylamide, agarose, agar, methyl cellulose, polyvinyl acetate and polyvinyl pyrrolidone, and polyethylene glycol.

15. (Withdrawn) A security ink comprising proteorhodopsin and one or more hydrophilic polymers, wherein the proteorhodopsin and the hydrophilic polymers form a homogeneous liquid phase, said ink solidifies or dries after application onto a surface, thereby immobilizing proteorhodopsin onto a specific location where the ink is applied.

16. (Withdrawn) The security ink according to Claim 15, wherein said hydrophilic polymer is gum arabica, polyvinyl alcohol, polyvinyl acetate, polyethylene glycol or

polyvinyl pyrrolidone.

17. (Withdrawn) A method for preparing a solid material containing a hydrophilic polymer and immobilized proteorhodopsin, comprising the steps of:
mixing a hydrophilic polymer or its precursor with proteorhodopsin in an aqueous solution to form a homogeneous solution; and
solidifying the solution, whereby the proteorhodopsin is immobilized in the hydrophilic polymer.

18. (Withdrawn) A method for preparing a polyvinyl alcohol material containing immobilized proteorhodopsin, comprising the steps of:
mixing polyvinyl alcohol, a buffer having pH between 3-12, and proteorhodopsin to form a solution;
dispersing the solution on a solid form; and
drying the solution to form a material containing immobilized proteorhodopsin.

19. (Withdrawn) A method for preparing a polyacrylamide material containing immobilized proteorhodopsin, comprising the steps of:
mixing acrylamide, bisacrylamide, membrane-free proteorhodopsin, and one or more polymerization initiators or a UV-induced polymerization agent in a buffer having pH between 3-12; and
polymerizing the acrylamide gel;
whereby the proteorhodopsin is immobilized within the polyacrylamide gel matrix.

20. (Withdrawn) A method for preparing a sol-gel containing immobilized proteorhodopsin, comprising the steps of:
(a) adding to a silane precursor an acidic solution having pH 1.5-4 to hydrolyze the silane precursor to form silicate sol;
(b) adding to the silicate sol an aqueous solution containing proteorhodopsin at pH about 5-9; and

(c) incubating (b) to form gel;

whereby the proteorhodopsin is immobilized within the sol gel matrix

21. (Withdrawn) The method according to Claim 20, wherein said silane precursor is tetraalkylorthosilicate, alkyltrialkoxysilane, aryltrialkoxysilane, dialkyldialkoxysilane, diaryldialkoxysilane, alkali metal silicate, polyol silicate, polyol siloxane, poly(methyl silicate), or alcohol-free poly(silicic acid).

22. (Withdrawn) The method according to Claim 21, wherein said silane precursor is tetramethylorthosilicate or tetraetholorthosilicate

23. (Withdrawn) The method according to Claim 21, wherein said silane precursor is poly(glyceryl)silicate.

24. (Withdrawn) A method for preparing gelatin containing immobilized proteorhodopsin, comprising the steps of:

(a) heating and dissolving gelatin in water or a buffer to form a homogeneous aqueous gelatin solution;

(b) cooling the gelatin solution to about 39-45°C ; and

(c) mixing the cooled gelatin solution with proteorhodopsin; and

(d) incubating (c) to form gel;

whereby the proteorhodopsin is immobilized within the gelatin gel matrix

25. (Withdrawn) A method for preparing three-dimensional optical data storage material, comprising casting a block of material containing immobilized proteorhodopsin to form a thickly cast optical data storage material.

26. (Original) A method of optically storing information on a material containing immobilized proteorhodopsin, comprising:

(a) directing onto a material containing immobilized proteorhodopsin light of a first spectral range representing optical information to be stored;

(b) exposing a selected portion of the material containing immobilized proteorhodopsin to switch the proteorhodopsin from its basal state to its M-state; and

(c) storing in said material an optical image representing optical information stored;

wherein the stored image comprises M-state material having altered absorption spectra at a second spectral range.

27. (Original) The method according to Claim 26, further comprising directing light of said second spectral range onto said material to cause said M-state material to switch back to said basal state, whereby the optical image is erased.

28. (Currently Amended) ~~The~~ A method of producing a three-dimensional optical image for information storage, comprising:

(a) directing onto a three-dimensional optical information storage material that contains immobilized proteorhodopsin a first spectral range representing optical information to be stored;

(b) exposing selected locations and selected layers of the optical information storage material to switch the proteorhodopsin from its basal state to its M-state; and

(c) producing in said material a three-dimensional optical image representing optical information stored; wherein the image comprises M-state material having altered absorption spectra at a second spectral range.

29. (Currently Amended) An optical data storage device comprising a light source and an optical data information carrier comprising a solid material having immobilized detergent-solubilized proteorhodopsin, wherein the light source emits a writing light to convert the proteorhodopsin from a basal state to a M-state.

30. (Original) The optical data storage device according to Claim 29, further comprising a second light source that emits a deleting light to convert the M-state into the

basal state.

31. (Withdrawn) A method of preparing a fraud-proof material comprising:

(a) providing a homogeneous liquid ink comprising proteorhodopsin and one or more hydrophilic polymers;

(b) dispersing the ink onto a material; and

(c) drying the ink, wherein the ink provides the fraud-proof feature.